

PLEORA TECHNOLOGIES INC.



iPORT™ HDSDI-U3 External Frame Grabber User Guide



Copyright © 2015 Pleora Technologies Inc.

These products are not intended for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Pleora Technologies Inc. (Pleora) customers using or selling these products for use in such applications do so at their own risk and agree to indemnify Pleora for any damages resulting from such improper use or sale.

Trademarks

PureGEV, eBUS, iPORT, vDisplay, AutoGEV, AutoGen, and all product logos are trademarks of Pleora Technologies. Third party copyrights and trademarks are the property of their respective owners.

Notice of Rights

All information provided in this manual is believed to be accurate and reliable. No responsibility is assumed by Pleora for its use. Pleora reserves the right to make changes to this information without notice. Redistribution of this manual in whole or in part, by any means, is prohibited without obtaining prior permission from Pleora.

Document Number

EX001-023-0010, Version 2.0, 3/3/15

Table of Contents

About this Guide	1
What this Guide Provides	2
Start Streaming Video	2
Related Documents	2
About the iPORT HDSDI-U3 External Frame Grabber	3
The iPORT HDSDI-U3 External Frame Grabber	4
iPORT HDSDI-U3 External Frame Grabber Models	5
Feature Set	6
Selected GenICam Features	7
HDSDI-U3 External Frame Grabber Connections	11
Connector Locations	12
BNC Connectors	13
9-Pin D-Sub Connector	13
Micro-B USB 3.0 Connector	14
Status LEDs	15
HDSDI-U3-IND External Frame Grabber: Signal Handling	17
HDSDI-U3-IND External Frame Grabber: Bulk Interface	19
RS-485 Connections	20
GenICam Interface for Serial Communication Configuration	20
RS-485 Timing	21
Installing the eBUS SDK	23
Installing the eBUS SDK	24
Installing the Driver	24
Connecting to the External Frame Grabber and Configuring General Settings	27
Connecting the USB and Coaxial Cables and Confirming Image Streaming	28
Starting eBUS Player and Streaming Video	29
Configuring the Buffers	30
Reporting Video Data	30
Configuring the External Frame Grabber's Image Settings	32
Configuring How Images are Acquired	36
Implementing the eBUS SDK	39
Reference: Mechanical Drawings and Material List	41
Mechanical Drawings	42
Surface or Wall-Mounted HDSDI-U3-IND External Frame Grabber	44
Material List	45
Reference: Surface or Wall-Mount Bracket Assembly	47

System Troubleshooting	49
Technical Support	51

PRELIMINARY

Chapter 1



About this Guide

This chapter describes the purpose and scope of this guide, and provides a list of complementary guides.

The following topics are covered in this chapter:

- [“What this Guide Provides”](#) on page 2
- [“Start Streaming Video”](#) on page 2
- [“Related Documents”](#) on page 2

What this Guide Provides

This guide provides you with the information you need to connect the HDSDI-U3 External Frame Grabber to HD-SDI or SD-SDI cameras. In this guide, you can find a product overview, instructions for installing the Pleora eBUS™ SDK, connecting the cables, establishing a USB 3.0 connection, performing general configuration tasks, and configuring the settings to properly capture and display images from HD-SDI or SD-SDI cameras.

The last chapter of this guide provides Technical Support contact information for Pleora Technologies.

Start Streaming Video

If you want to quickly start streaming video, you can jump to:

- “Installing the eBUS SDK” on page 23
- “Connecting to the External Frame Grabber and Configuring General Settings” on page 27
- “Starting eBUS Player and Streaming Video” on page 29
- “Configuring How Images are Acquired” on page 36

Related Documents

The *iPORT HDSDI-U3 External Frame Grabber User Guide* is complemented by the following guides:

- *eBUS Player Quick Start Guide*
- *eBUS Player User Guide*
- *eBUS SDK C++ API Quick Start Guide* and *eBUS SDK C++ API Help File*
- *eBUS SDK .NET API Quick Start Guide* and *eBUS SDK .NET API Help File*
- *eBUS SDK for Linux Quick Start Guide*
- *eBUS SDK Programmer's Guide*
- *USB3 Vision Standard*, available from the Automated Imaging Association (AIA) at www.visiononline.org
- *GenICam Standard Features Naming Convention*, available from the European Machine Vision Association (EMVA) at www.emva.org
- *iPORT Advanced Features User Guide*

Chapter 2



About the iPORT HDSDI-U3 External Frame Grabber

This chapter describes the external frame grabber, including the models and key features.

The following topics are covered in this chapter:

- “The iPORT HDSDI-U3 External Frame Grabber” on page 4
- “iPORT HDSDI-U3 External Frame Grabber Models” on page 5
- “Feature Set” on page 6
- “Selected GenICam Features” on page 7

The iPORT HDSDI-U3 External Frame Grabber

Pleora's HDSDI-U3 External Frame Grabbers provide systems manufacturers and integrators with cost and design flexibility advantages by converting HD-SDI or SD-SDI cameras, video processors, and systems into native USB3 Vision™ equipment. With these external frame grabbers, HD-SDI or SD-SDI equipment can transport high-speed imaging and video data over the widely available USB 3.0 bus. The equipment can also be used with a broader selection of smaller form factor, low-power computing platforms to help reduce system costs.

Based on a field-proven design, the HDSDI-U3 delivers additional benefits including high bandwidth output, extended operating temperature range, GPIO, and RS-485 data communications functionality enabling real-time, low-jitter triggering of cameras, video processors, and synchronization of other imaging system elements.

The HDSDI-U3 transmits video from HD-SDI or SD-SDI cameras, endoscopes, and other equipment with low, predictable latency over a USB 3.0 link. The connection at the workstation is a standard USB 3.0 port, eliminating the need for a desktop computer with an available peripheral card slot for a traditional frame grabber. As a result, system designers can reduce system size, cost, and power consumption by using computing platforms with smaller form factors, such as laptops, embedded computers, and single-board computers.

Pleora's HDSDI-U3 External Frame Grabbers help systems manufacturers and integrators to leverage the performance attributes of USB 3.0, including high-bandwidth, power over cable, and plug-and-play usability. The HDSDI-U3 complies fully with the USB3 Vision and GenICam™ standards, ensuring interoperability with third-party equipment in multi-vendor environments.

This guide uses the following terms:

- HDSDI-U3 External Frame Grabber: standard model
- HDSDI-U3-IND External Frame Grabber: industrial model

iPORT HDSDI-U3 External Frame Grabber Models

The iPORT HDSDI-U3 External Frame Grabber is available in several models and is equipped with the parts listed in the following table.

Table 1: HDSDI-U3 External Frame Grabber Models

Order code	Model	Quantity
903-0015	iPORT HDSDI-U3 External Frame Grabber (Standard Model)	
	iPORT HDSDI-U3 External Frame Grabber <ul style="list-style-type: none">Operating temperature: 0° to 45° C	1
903-0017	iPORT HDSDI-U3 Kit	
	iPORT HDSDI-U3 External Frame Grabber (903-0015)	1
	USB 3.0 cable	1
	eBUS SDK USB stick	1
903-0016	iPORT HDSDI-U3-IND External Frame Grabber (Industrial Model)	
	iPORT HDSDI-U3-IND External Frame Grabber <ul style="list-style-type: none">SD-SDI and HD-SDI video loop-through outputRS-485 serial portGPIOOperating temperature: -40° to 65° C	1
903-0018	iPORT HDSDI-U3-IND Kit	
	iPORT HDSDI-U3-IND External Frame Grabber (903-0016)	1
	USB 3.0 cable	1
	eBUS SDK USB stick	1
909-1102	iPORT HDSDI-U3 Bracket Kit	
	Bracket for wall mounting or surface mounting an HDSDI-U3 External Frame Grabber or an HDSDI-U3-IND External Frame Grabber	1
	Brackets	2
	Mounting screws	4

Feature Set

The HDSDI-U3 External Frame Grabber provides the features and functions listed in the table below.

Table 2: HDSDI-U3 External Frame Grabber Feature Set

Key features
USB 3.0 interface
Compliant with USB3 Vision version 1.0
Compliant with SMPTE 292, SMPTE 259, SMPTE 296, and SMPTE 274
120 MB frame buffer
Record-and-playback capability
USB-powered
Standard 75 ohm BNC connectors

	HDSDI-U3	HDSDI-U3-IND
Order code	903-0015	903-0016
Description	Standard	Industrial-use
SDI video loop-through	No	Yes
RS-485 serial port	No	Yes
GPIO: TTL single-ended input	N/A	3
GPIO: TTL single-ended output	N/A	1
Operating temperature	0 °C to 45 °C	-40 °C to 65 °C
Storage temperature	-40 °C to 85 °C	-40 °C to 85 °C
Power Consumption	2.1 W	2.3 W

Selected GenICam Features

The HDSDI-U3 External Frame Grabber supports the seven features mandated by the USB3 Vision standard, listed in the following table.

Table 3: Selected GenICam Features

Feature	Description
Width	Specifies the width of the image (in pixels).
Height	Specifies the height of the image (in pixels).
OffsetX	Specifies the horizontal image offset (in pixels).
OffsetY	Specifies the vertical image offset (in pixels).
PixelFormat	Specifies the pixel format: <ul style="list-style-type: none">• Mono8, Mono10, Mono10p• YCbCr601_422_8_CbYCrY, YCbCr601_422_10p_CbYCrY• YCbCr709_422_8_CbYCrY, YCbCr709_422_10p_CbYCrY
WidthMax	Maximum width of the image (in pixels).
HeightMax	Maximum height of the image (in pixels).

The following table provides descriptions for selected HDSDI-U3 External Frame Grabber features.



When the **SdiInputAutoSelect** feature is set to **True**, the **PixelFormat** and **SdiInputVideoFormat** features under **ImageFormatControl** are read-only and show the result of the auto-selection. For more information about this feature, see [“Automatic Configuration of the Image Settings”](#) on page 32.

Table 4: Selected HDSDI-U3 External Frame Grabber Features

Feature	Description
SdiInputVideoFormat	Defines the video resolution, scan mode, and data rate of the SDI source.
SdiInputAutoSelect	Controls whether or not the video format and pixel format are auto-selected.
SdiLoopThroughOutput	Controls whether or not the SDI loop-through output feature is enabled.
SdiPllLocked	Indicates whether or not the SDI receiver PLL is locked to the input video.
SdiVideoStandardLocked	Indicates whether or not the SDI receiver is fully synchronized to the incoming video and whether or not it detects the video as one of the supported formats.
SdiVideoActiveWidth	Reports the number of active pixels per video line for the incoming video.
SdiVideoActiveHeight	Reports the number of active lines per video frame for the incoming video.
SdiVideoScanMode	Indicates whether the incoming video is interlaced or progressive.
SdiVideoFrameRate	Reports the frame rate for the incoming video as defined by SMPTE ST 352:2011.
SdiVideoPixelFormat	Reports the pixel format for the incoming video as defined by SMPTE ST 352:2011.

Table 4: Selected HDSI-U3 External Frame Grabber Features (Continued)

Feature	Description
SdiVideoPixelBitDepth	Reports the pixel bit depth for the incoming video.
SdiVideoDataRate	Reports the data rate for the incoming video.
SdiVideoErrorsStatus	Indicates various video signal errors detected by the device.
SdiVideoErrorsClear	Clears the video signal errors.

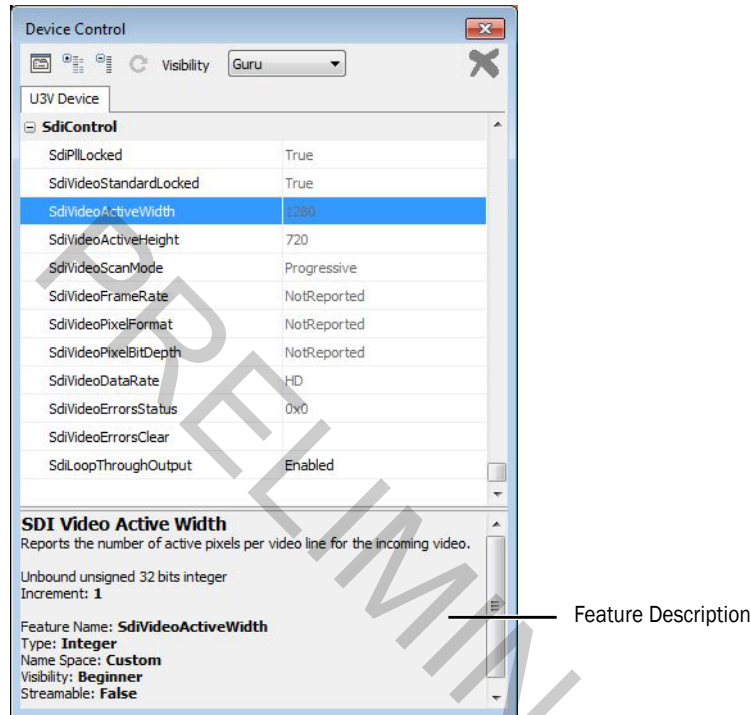
The full list of HDSI-U3 External Frame Grabber features can be seen in the **Device Control** dialog box of Pleora's eBUS Player application.

To view the full list of features

1. Start eBUS Player from the Windows Start menu.
2. Click **Select/Connect**.
3. In the **Device Selection** dialog box, click the external frame grabber.
4. Click **OK**.
eBUS Player is now connected to the device.
5. Under **Parameters and Controls**, click **Device control**.
6. Select **Guru** from the **Visibility** list.
7. Expand the headings to view all of the features and parameters.

Feature Descriptions

You can view descriptions of each feature and parameter at the bottom of the **Device Control** dialog box by first selecting the feature. In the following image, **SdiVideoActiveWidth** is selected and the description of this feature is shown below.



PRELIMINARY

Chapter 3



HDSDI-U3 External Frame Grabber Connections

This chapter describes the HDSDI-U3 External Frame Grabber connections, including connector details and pinout information.

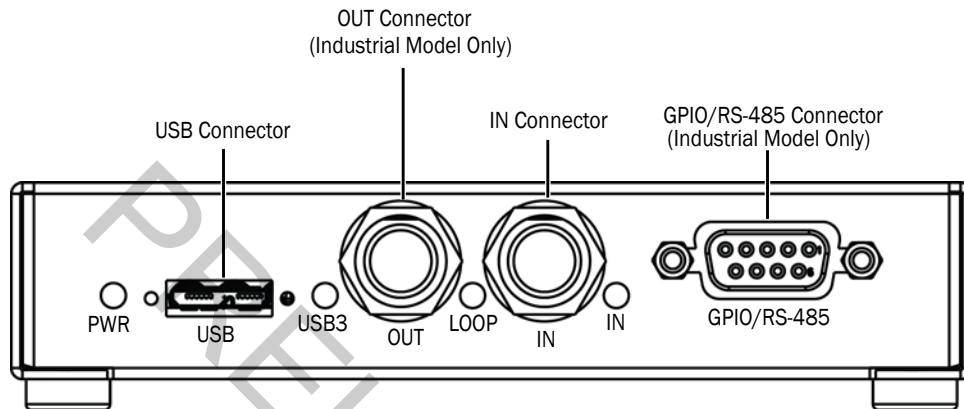
The following topics are covered in this chapter:

- “Connector Locations” on page 12
- “BNC Connectors” on page 13
- “9-Pin D-Sub Connector” on page 13
- “Micro-B USB 3.0 Connector” on page 14
- “Status LEDs” on page 15

Connector Locations

The following figure and table describe the HDSDI-U3 External Frame Grabber connectors.

Figure 1: HDSDI-U3 External Frame Grabber Connectors



Depending on your product model, some connectors may not be available. See the table below for more detail about the connectors available on the standard and industrial models.

Table 5: HDSDI-U3 External Frame Grabber Connectors

Connector/switch	Type	Description
USB	Micro-B USB 3.0 connector	Connects a computer to the external frame grabber using a USB3 Vision connection. Compatible with USB 3.0 (SuperSpeed) connections. Supplies power to the external frame grabber using USB 3.0.
OUT	75 ohm BNC connector	SDI video loop-through output. Available on <u>industrial model only</u> .
IN	75 ohm BNC connector	SDI video input.
GPIO/RS-485	9-pin D-Sub connector	Provides access to the single-ended GPIO inputs and output, and the RS-485 serial port. Available on <u>industrial model only</u> .

BNC Connectors

The HDSDI-U3 External Frame Grabber supports HD-SDI and SD-SDI cameras, which stream video data to the external frame grabber's input.

The iPORT HDSDI-U3-IND External Frame Grabber (industrial model) supports an HD-SDI and SD-SDI loop-through output with an equalized and re-timed signal. The input and loop-through output are accessed with standard bayonet-style BNC 75 ohm connectors.

9-Pin D-Sub Connector

On the HDSDI-U3-IND External Frame Grabber (industrial model), the 9-pin D-Sub connector provides access to the GPIO input and output signals, and the RS-485 serial port. The RS-485 serial port is typically used for remotely controlling the operation of a suitably equipped HD-SDI or SD-SDI camera. It supports 2-wire half-duplex or simplex operation.

The GPIO pins allow an external signal to control an HD-SDI or SD-SDI camera, and are typically used for triggering events. For example, you can use a trigger to synchronize image capture from multiple cameras or to synchronize image capture with an external device.

The HDSDI-U3-IND External Frame Grabber's built-in Programmable Logic Controller (PLC) is used to process and control the GPIO signals (GPIO_OUT0, GPIO_IN2, GPIO_IN1, and GPIO_IN0).

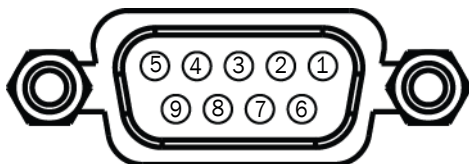


For more information about using the PLC, see “[HDSDI-U3-IND External Frame Grabber: Signal Handling](#)” on page 17. You can also refer to the Pleora *iPORT Advanced Features User Guide*, available on the Pleora Support Center at www.pleora.com.

9-Pin D-Sub Connector Pinouts

The pinouts for the 9-pin D-Sub connector are shown in the following image, and listed in the following table.

Figure 2: 9-Pin D-Sub Connector Pinouts



For information about the 9-pin D-Sub connector manufacturer and part number, see “[Material List](#)” on page 45.

Table 6: HDSOI-U3 External Frame Grabber 9-Pin D-Sub Connector Pinouts

Pin	Name	Type	PLC signal name
1	GPIO_IN0	Single-ended input	GpioIn0
2	Reserved	Reserved	N/A
3	RS-485-	RS-485 input/output	N/A
4	GPIO_OUT0	Single-ended output	GpioOut0
5	GND/EMI_GND	Signal ground	N/A
6	GPIO_IN1	Single-ended input	GpioIn1
7	RS-485+	RS-485 input/output	N/A
8	Reserved	Reserved	N/A
9	GPIO_IN2	Single-ended input	GpioIn2

9-Pin D-Sub Connector GPIO Signals

The GPIO output and inputs on the 9-pin D-Sub connector support single ended TTL/LVTTL voltage levels.

Table 7: Electrical Characteristics for GPIO Signals

Name	Description
GPIO_OUT (Single-ended TTL/LVTTL output)	VOL maximum (low-level output voltage) = 0.4 V maximum at 4 mA VOH minimum (high-level output voltage) = 2.8 V minimum at 4 mA VOH maximum (high-level output voltage) = 3.4 V maximum IOL maximum (low-level output current) = -4 mA maximum IOH maximum (high-level output current) = 4 mA maximum
GPIO_IN (Single-ended TTL/LVTTL inputs)	VIL (low-level input voltage) = -0.5 V to 0.8 V VIH (high-level input voltage) = 2.0 V to 5.5 V

Micro-B USB 3.0 Connector

The HDSOI-U3 External Frame Grabber uses a Micro-B USB 3.0 connector to communicate with your computer.

Power over a USB 3.0 Connection

The USB 3.0 connection powers the external frame grabber. The USB 3.0 port is required to provide up to 900 mA to the external frame grabber. If the host controller manages multiple ports and there are other devices that draw a large amount of power (for example, another USB3 Vision device or a hard drive), the host controller may not grant the requested 900 mA, resulting in dropped images, dropped connections, or failure to connect. Similarly, on a USB hub, ensure 900 mA is available for the port.

Locking Connectors

The HDSDI-U3 External Frame Grabber has been designed to support the Micro-B locking connectors specified by the USB3 Vision standard. The case includes threaded screw holes that comply with the connectors specified in the standard.

Status LEDs

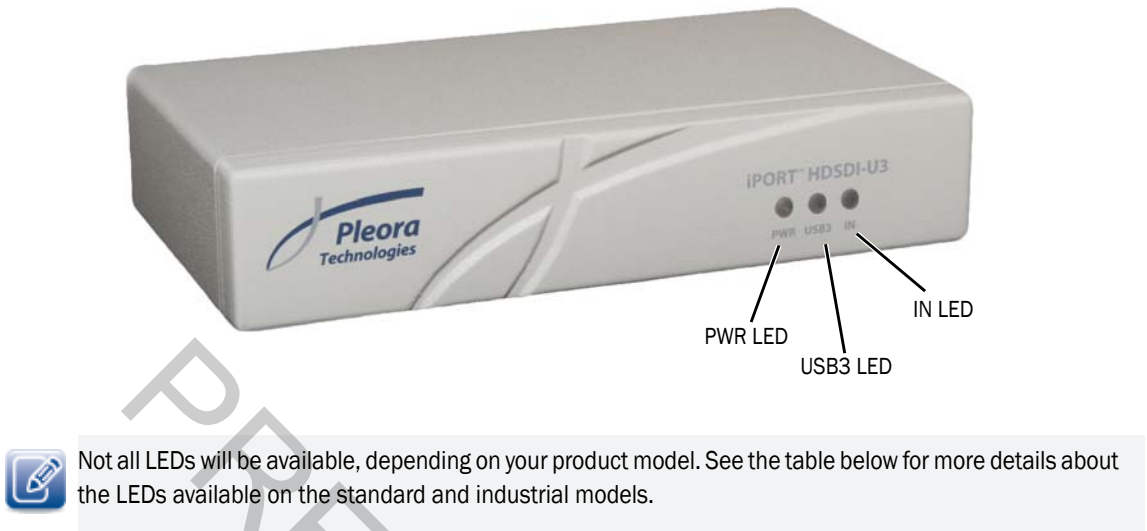
The HDSDI-U3 External Frame Grabber has status LEDs that indicate the operating status of its USB controller, the connection between the HDSDI-U3 External Frame Grabber and the host computer, power, and firmware, as described in the following figures and table.

For the iPORT HDSDI-U3-IND External Frame Grabber (industrial model), an additional LED, located on the back panel, shows HD-SDI and SD-SDI loop-through status.

Figure 3: HDSDI-U3 External Frame Grabber Status LEDs: Back



Figure 4: HDSDI-U3 External Frame Grabber Status LEDs: Front



Not all LEDs will be available, depending on your product model. See the table below for more details about the LEDs available on the standard and industrial models.

Table 8: HDSDI-U3 External Frame Grabber Status LED Descriptions

LED	Description
USB3	Solid green: A USB 3.0 signal is present. Green with flashing yellow (or orange): A USB 3.0 connection is established. Flashing yellow (or orange): A USB 2.0 connection is established. Off: A USB 3.0 signal is not present, but a USB 2.0 signal may be present.
PWR	Green: The HDSDI-U3 External Frame Grabber is receiving power and the main firmware load is being used. Orange: The HDSDI-U3 External Frame Grabber is receiving power and the backup firmware load* is being used. Off: The HDSDI-U3 External Frame Grabber is not receiving power.
IN	Green: An HD-SDI or SD-SDI signal on the input is present and supported. Red: An HD-SDI or SD-SDI signal on the input is present, but not supported. Off: An HD-SDI or SD-SDI signal is not present.
LOOP (Industrial Model Only)	Green: The HD-SDI and SD-SDI loop-through output is enabled. Off: The HD-SDI and SD-SDI loop-through is disabled.

*The backup firmware load is used only if the main firmware load becomes corrupted. The backup load allows you to reprogram the main firmware load, which restores the device to its original settings.

Chapter 4



HDSDI-U3-IND External Frame Grabber: Signal Handling

The HDSDI-U3-IND External Frame Grabber (industrial model) includes a programmable logic controller (PLC) that lets you control external machines and react to inputs. By controlling your system using the PLC, you can make functional changes, adjust timing, or add features without adding new hardware.



For an introduction to the PLC and for detailed information about how PLC signals are handled, see the *iPORT Advanced Features User Guide*, available on the Pleora Support Center at www.pleora.com.

The following table lists the PLC input and output programming signals that are specific to the HDSDI-U3-IND External Frame Grabber (industrial model), and indicates the pins on which they are available.

Table 9: PLC Signal Usage

Signal name	PLC equation usage	Associated pin on the 9-pin D-Sub connector
Pb0Fval	In	No associated pin
Pb0Lval	In	No associated pin
Pb0Dval	In	No associated pin
Pb0Spare	In	No associated pin
GpioIn0	In	Associated to pin 1 (GPIO_IN0)
GpioIn1	In	Associated to pin 6 (GPIO_IN1)
GpioIn2	In	Associated to pin 9 (GPIO_IN2)
BufferWM0	In	No associated pin
Grb0AcqActive	In	No associated pin
PlcCtrl0	In	No associated pin

Table 9: PLC Signal Usage (Continued)

Signal name	PLC equation usage	Associated pin on the 9-pin D-Sub connector
PlcCtrl1	In	No associated pin
PlcCtrl2	In	No associated pin
PlcCtrl3	In	No associated pin
GpioOut0	In, out	Associated to pin 4 (GPIO_OUT0)
PlcFval0	In, out	No associated pin
PlcLval0	In, out	No associated pin
PlcTrig0	In, out	No associated pin
PlcTimestampCtrl	In, out	No associated pin
Timer0Trig	In, out	No associated pin
Timer0Out	In	No associated pin
Timer1Trig	In, out	No associated pin
Timer1Out	In	No associated pin
Counter0Reset	In, out	No associated pin
Counter0Inc	In, out	No associated pin
Counter0Dec	In, out	No associated pin
Counter0Eq	In	No associated pin
Counter0Gt	In	No associated pin
Counter1Reset	In, out	No associated pin
Counter1Inc	In, out	No associated pin
Counter1Dec	In, out	No associated pin
Counter1Eq	In	No associated pin
Counter1Gt	In	No associated pin
Rescaler0In	In, out	No associated pin
Rescaler0Out	In	No associated pin
Delayer0In	In, out	No associated pin
Delayer0Out	In	No associated pin
Event0	In, out	No associated pin
Event1	In, out	No associated pin
Event2	In, out	No associated pin
Event3	In, out	No associated pin

Chapter 5



HDSDI-U3-IND External Frame Grabber: Bulk Interface

The HDSDI-U3-IND External Frame Grabber (industrial model) has one Bulk interface (Bulk0) available for serial communication with a connected HD-SDI or SD-SDI camera.

The Bulk0 interface is mapped to the RS-485 serial port available on the 9-pin D-Sub connector on the external frame grabber.

The following topics are covered in this chapter:

- “RS-485 Connections” on page 20
- “GenICam Interface for Serial Communication Configuration” on page 20
- “RS-485 Timing” on page 21

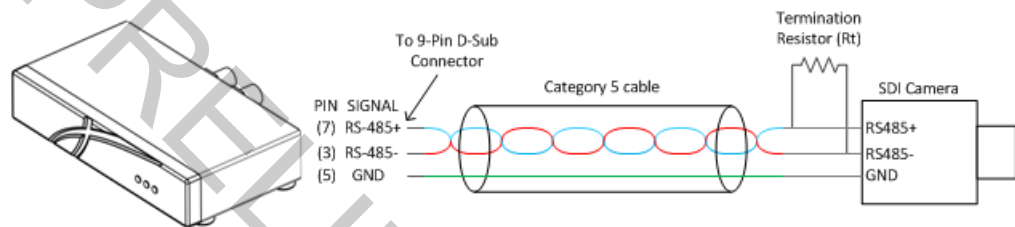
RS-485 Connections

The HDSDI-U3-IND External Frame Grabber (industrial model) supports half-duplex (bi-directional) and simplex (unidirectional) RS-485 communication over a single pair of twisted cables.

No camera-specific protocol has been implemented in the HDSDI-U3-IND; this must be done on the host-side, based on the camera specifications.

The following diagram illustrates a typical point-to-point connection with a camera over the RS-485 serial interface.

Figure 5: HDSDI-U3-IND and Camera Connection over RS-485 Serial Interface



To avoid signal reflections, we recommend that you terminate the camera-side end of the RS-485 cable with a $120\ \text{ohm} \pm 2\%$ resistor (R_t). The HDSDI-U3-IND already implements a permanent internal termination resistor, as required for half-duplex operation.

GenICam Interface for Serial Communication Configuration

The following GenICam features are available for serial communication configuration.

Table 10: GenICam Features Available for Serial Communication

Feature	Description
BulkSelector	Selects Bulk0 for configuration.
BulkBaudRate	Selects a predefined baud rate or programmable option.
BulkBaudRateFactor	Programs a user-defined baud rate (available when BulkBaudRate = Programmable).
BulkLoopback	Loops back downstream data to upstream direction (loops the data back to the computer).
BulkNumOfStopBits	Selects a stop bit option (either 1 or 2).

Table 10: GenICam Features Available for Serial Communication (Continued)

Feature	Description
BulkParity	Selects a parity option (None, Even, or Odd).
BulkUpstreamFifoWatermark	Controls the number of bytes to accumulate in the bulk interface upstream FIFO before the external frame grabber delivers them to the host using an event type packet.

RS-485 Timing

The RS-485 serial port supports:

- 8-bit data transfer
- 1 start bit
- Programmable stop bit(s): 1 or 2 stop bits
- Parity: even, odd, or none
- Baud rates:
 - Predefined rates: 9 600, 14 400, 19 200, 28 800, 38 400, 57 600, 11 5200
 - Programmable
- Loop back mode from downstream to upstream

Figure 6: UART Timing Diagram



Table 11: Standard Bandwidth Serial UART Baud Rates and Data Periods

Baud rate	Data period
115 200	8.7
57 600	17.4
38 400	26.0
28 800	34.7
19 200	52.1
14 400	69.4
9 600	104.1

A number of preset baud rates can be used, as well as a more flexible baud rate factor, as listed in the following table.

Table 12: UART Baud Rates

Baud factor, BF	Baud rate, BR (bps)	Notes
BF	$1/(BF \cdot 240ns)$	Programmable
1 (min)	4 166 667	
36	115 200	Preset 6
72	57 600	Preset 5
108	38 400	Preset 4
144	28 800	Preset 3
218	19 200	Preset 2
290	14 400	Preset 1
434	9 600	Preset 0 (default)
511 (max)	8 154	

To program bulk baud rates in the GenICam interface, configure the following settings:

- **BulkBaudRate** = Programmable
- **BulkBaudRateFactor** = (Enter integer value between 1 and 511)
- **BulkBaudRateValue** = (Display of programmable baud rate)

The following table provides the A.C. operating characteristics of the UART interface

Table 13: A.C Operating Characteristics of the UART Interface

Parameter	Symbol	Minimum	Maximum	Units	Notes
Data period	t_{UART}	0.240	122.64	μs	
Baud rate	BR	8,154	4,166,667	bps	$1/t_{UART}$

Chapter 6



Installing the eBUS SDK

This chapter describes how to install the eBUS SDK, and also provides information about installing the required driver.

Before you can configure and control your external frame grabber, you must ensure that the eBUS SDK and USB3 Vision driver are installed on your computer.

The following topics are covered in this chapter:

- “Installing the eBUS SDK” on page 24
- “Installing the Driver” on page 24

Installing the eBUS SDK

You can install the Pleora eBUS SDK on your computer to configure and control your external frame grabber. Consult the *eBUS Player Quick Start Guide* or *eBUS Player User Guide* for information about setting up and configuring your camera for connection to the external frame grabber.

The Pleora Technologies eBUS SDK contains an extensive library of sample applications, with source code, to create working applications for device configuration and control, image and data acquisition, and image display and diagnostics.

It is possible for you to configure the external frame grabber and USB3 Vision compliant video sources using other GenICam compliant software, however, this guide provides you with the instructions you need to use the Pleora eBUS Player application.



You should install version v4.0.6 (or later) of the eBUS Player.

Installing the Driver

Before you can configure the external frame grabber, you must have the Pleora USB3 Vision driver installed on your computer.

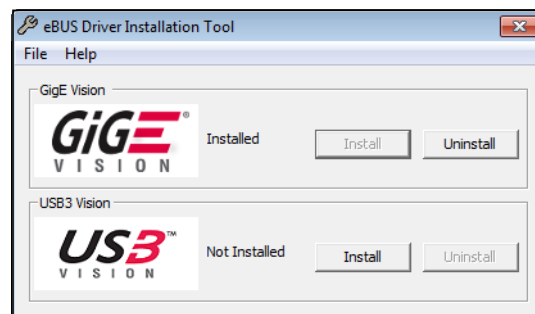


The USB3 Vision driver is installed by default during the eBUS SDK installation process. You can also manually install and uninstall this driver using the eBUS Driver Installation Tool. The driver must be installed before you can use eBUS Player or any 3rd party SDK software to configure the external frame grabber. If the USB3 Vision driver is not installed, the software will not detect the external frame grabber.

To install a Pleora driver

1. Click **Start > All Programs > Pleora Technologies Inc > eBUS SDK > Tools > eBUS Driver Installation Tool**.
2. Under **USB Vision**, click **Install**.

The USB3 Vision driver is installed across all USB3 Vision devices on your computer.



3. Close the eBUS Driver Installation Tool.

You may be required to restart your computer.



To see the versions of the installed drivers, click **Help > About**.

PRELIMINARY

PRELIMINARY

Chapter 7



Connecting to the External Frame Grabber and Configuring General Settings

This chapter provides you with the information you need to set up the physical connections to the external frame grabber. You can start eBUS Player to ensure images are received and displayed properly. You can also configure the buffer options to reduce the likelihood of lost packets.



More detailed information about using eBUS Player, including saving configuration settings, is available in the *eBUS Player User Guide* and *eBUS Player Quick Start Guide*.

The following topics are covered in this chapter:

- “Connecting the USB and Coaxial Cables and Confirming Image Streaming” on page 28
- “Starting eBUS Player and Streaming Video” on page 29
- “Configuring the Buffers” on page 30
- “Reporting Video Data” on page 30
- “Configuring the External Frame Grabber’s Image Settings” on page 32
- “Configuring How Images are Acquired” on page 36
- “Implementing the eBUS SDK” on page 39

Connecting the USB and Coaxial Cables and Confirming Image Streaming

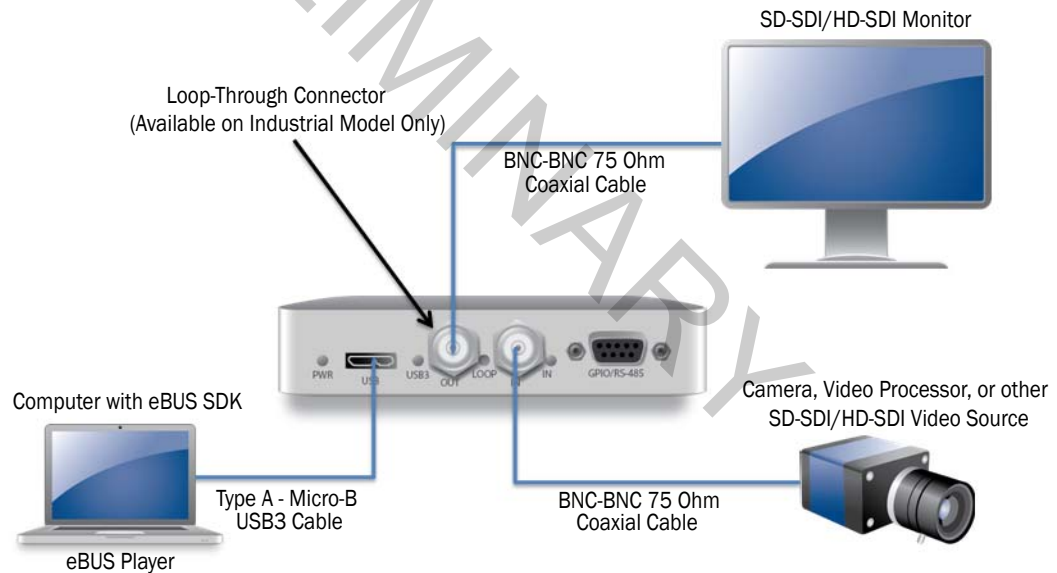
To confirm that images are streaming properly, make the following connections with the HDSDI-U3 External Frame Grabber:

- Connect the external frame grabber to a USB 3.0 port on your computer using a Type A - Micro-B USB 3.0 cable.
- If you have the HDSDI-U3-IND, you can connect the loop-through connector of the external frame grabber to an SD-SDI/HD-SDI monitor using a BNC-BNC 75 Ohm coaxial cable.
- Connect the external frame grabber to a camera, video processor, or other SD-SDI/HD-SDI video source.
- Connect to the external frame grabber using eBUS Player.



If the physical connections already exist, and eBUS Player has already been installed on your computer, you can go to [“Starting eBUS Player and Streaming Video”](#) on page 29.

Figure 7: HDSDI-U3 External Frame Grabber System Connections



You should not disable and then re-enable the USB port on the computer while the external frame grabber is connected. Doing this will result in a connection problem that will cause you to have to power-cycle the external frame grabber.

Starting eBUS Player and Streaming Video

The HDSDI-U3 External Frame Grabber features plug-and-play capabilities. It automatically detects incoming video and configures the image settings. To start streaming video, start eBUS Player, connect to your device, and click **Play**.



The HDSDI-U3 can start streaming video when you click **Play** in eBUS Player when the **SdiInputAutoSelect** feature is configured as **True**, which is the default setting. This feature enables the plug-and-play capability. For more information, see “[Configuring the External Frame Grabber’s Image Settings](#)” on page 32.

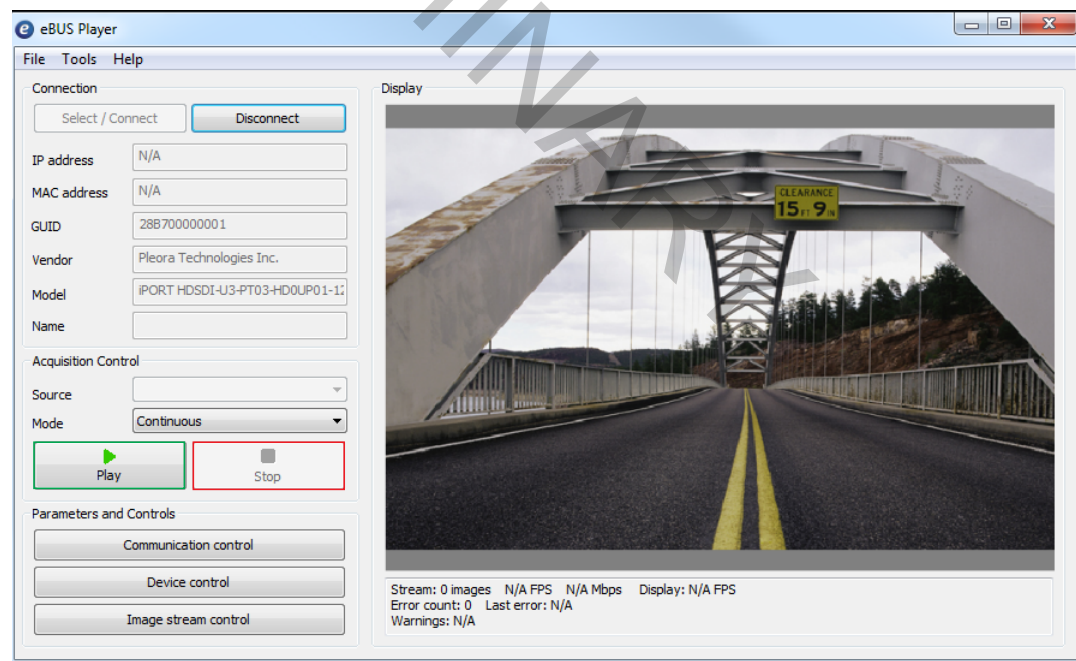
To start eBUS Player and stream video

1. Start eBUS Player from the Windows Start menu.
2. Click **Select/Connect**.
3. In the **Device Selection** dialog box, click the external frame grabber.
4. Click **OK**.

eBUS Player is now connected to the device.

To confirm image streaming

1. Click **Play** to stream live images.
2. After you confirm that images are streaming, click **Stop**.



You should not upload new firmware to your external frame grabber while streaming video. Doing this will automatically disconnect the external frame grabber.

Configuring the Buffers

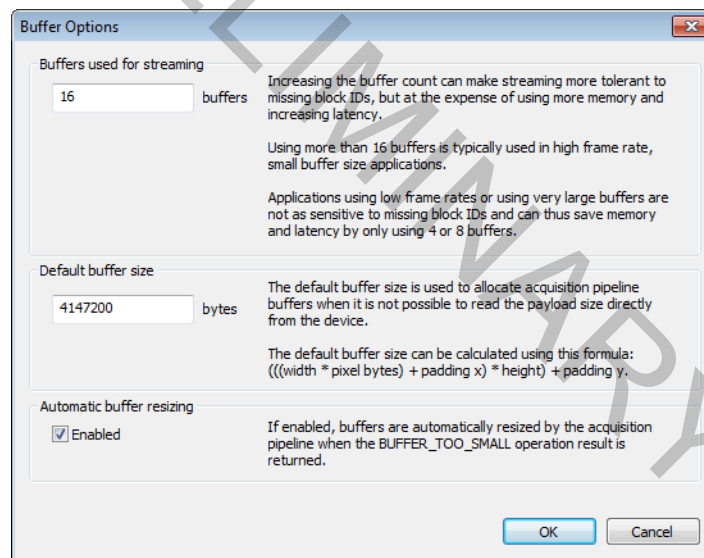
You can increase the buffer count using eBUS Player to make streaming more robust. A high number of buffers are needed in high frame rate applications, while a small number of buffers are needed for lower frame rates. Applications using a high number of buffers might experience greater latency.

To configure the buffers

1. Start eBUS Player and connect to the external frame grabber.
For more information, see “Starting eBUS Player and Streaming Video” on page 29.
2. Click **Tools > Buffer Options**.
3. Click the buffer option that suits your requirements.
4. Click **OK**.



Default size for streaming is 16 buffers.



Reporting Video Data

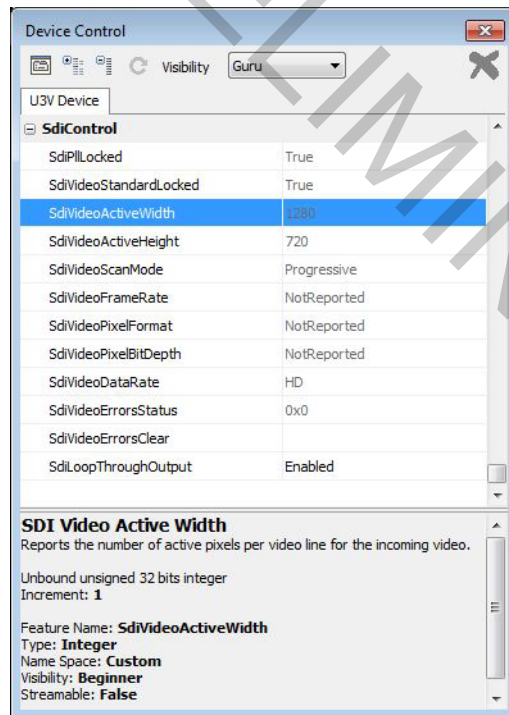
The HDSDI-U3 External Frame Grabber continuously monitors and reports information about the incoming SDI video signal.

To view reported SDI signal information

1. Start eBUS Player and connect to the external frame grabber.
For more information, see “Starting eBUS Player and Streaming Video” on page 29.

2. Under **Parameters and Controls**, click **Device control**.
3. Under **SdiControl**, you can view the reporting information for the following features:
 - SdVideoScanMode
 - SdVideoFrameRate
 - SdVideoPixelFormat
 - SdVideoPixelBitDepth
 - SdiPllLocked
 - SdiVideoStandardLocked
 - SdiVideoActiveWidth
 - SdiVideoActiveHeight
 - SdiVideoDataRate
 - SdiVideoErrorsStatus

Below is an example of the information reported under **SdiControl** for a 720p HD-SDI video signal from a camera (non-SMPTE ST 352:2011 compliant).



The SdiVideoFrameRate, SdiVideoPixelFormat, and SdiVideoPixelBitDepth features provide report details only if the incoming video complies with the SMPTE standard: ST 352:2011 (Payload Identification Codes for Serial Digital Interfaces). If the incoming video does not comply with this standard, "NotReported" is displayed.

Configuring the External Frame Grabber's Image Settings

By default, the external frame grabber automatically detects incoming video and configures the image settings available in the **Device Control** dialog box under **ImageFormatControl**.

The external frame grabber can perform this auto-selection when the **SdiInputAutoSelect** feature is set to **True**, which is the default setting.



When the **SdiInputAutoSelect** feature is set to **True**, the **PixelFormat** and **SdiInputVideoFormat** features under **ImageFormatControl** are read-only and show the result of the auto-selection.

Automatic Configuration of the Image Settings

The automatic selection of the **SdiInputVideoFormat** feature is based on the values reported for the **SdiVideoActiveWidth**, **SdiVideoActiveHeight**, **SdiVideoScanMode**, and **SdiVideoDataRate** features.

Table 14: Automatic Selection for the SdiInputVideoFormat Feature

Values	Selected SdiInputVideoFormat	WidthMax	HeightMax
SdiVideoActiveWidth = 1920 SdiVideoActiveHeight = 1080 SdiVideoScanMode = Progressive SdiVideoDataRate = HD	HD_1080p	1920	1080
SdiVideoActiveWidth = 1920 SdiVideoActiveHeight = 540 SdiVideoScanMode = Interlaced SdiVideoDataRate = HD	HD_1080i	1920	540
SdiVideoActiveWidth = 1280 SdiVideoActiveHeight = 720 SdiVideoScanMode = Progressive SdiVideoDataRate = HD	HD_720p	1280	720
SdiVideoActiveWidth = 1440 SdiVideoActiveHeight = 288 SdiVideoScanMode = Interlaced SdiVideoDataRate = SD	SD_576i	720	288

Table 14: Automatic Selection for the SdiInputVideoFormat Feature (Continued)

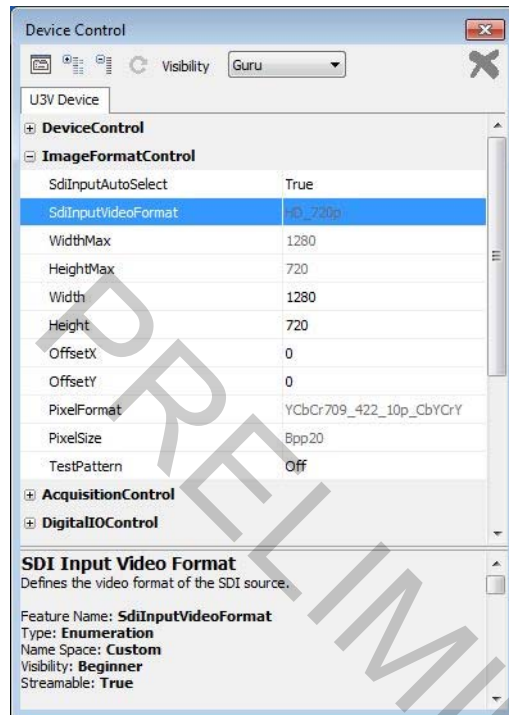
Values	Selected SdiInputVideoFormat	WidthMax	HeightMax
SdiVideoActiveWidth = 1440 SdiVideoActiveHeight = 244 SdiVideoScanMode = Interlaced SdiVideoDataRate = SD	SD_487i	720	243
SdiVideoActiveWidth = 1440 SdiVideoActiveHeight = 240 SdiVideoScanMode = Interlaced SdiVideoDataRate = SD	SD_480i	720	240

The automatic selection of the **PixelFormat** feature is based on the value reported for the **SdiVideoPixelFormat**, **SdiVideoPixelBitDepth** and **SdiVideoDataRate** features.

Table 15: Details of Automatic Selection for the PixelFormat Feature

Values	Selected PixelFormat	SDI source SMPTE ST 352:2011
SdiVideoPixelFormat = NotReported SdiVideoPixelBitDepth = NotReported SdiVideoDataRate = HD	YCbCr709_422_10p_CbYCrY	No
SdiVideoPixelFormat = YCbCr_422 SdiVideoPixelBitDepth = BitDepth_10_bits SdiVideoDataRate = HD	YCbCr709_422_10p_CbYCrY	Yes
SdiVideoPixelFormat = YCbCr_422 SdiVideoPixelBitDepth = BitDepth_8_bits SdiVideoDataRate = HD	YCbCr709_422_8_CbYCrY	Yes
SdiVideoPixelFormat = NotReported SdiVideoPixelBitDepth = NotReported SdiVideoDataRate = SD	YCbCr601_422_10p_CbYCrY	No
SdiVideoPixelFormat = YCbCr_422 SdiVideoPixelBitDepth = BitDepth_10_bits SdiVideoDataRate = SD	YCbCr601_422_10p_CbYCrY	Yes
SdiVideoPixelFormat = YCbCr_422 SdiVideoPixelBitDepth = BitDepth_8_bits SdiVideoDataRate = SD	YCbCr601_422_8_CbYCrY	Yes

Below is an example of the configuration of image settings under **ImageFormatControl** for a 720p HD-SDI camera. The image settings are based on information reported from the SDI camera, as previously discussed in [“Reporting Video Data”](#) on page 30.



Manual Configuration of Image Settings

You can also manually configure the external frame grabber's image settings, which provide the external frame grabber with information about the image coming from the camera.

Before you can manually configure the image settings, you must disable image auto-selection by changing the **SdiInputAutoSelect** feature to **False**. By doing this, the **PixelFormat** and **SdiInputVideoFormat** features under **ImageFormatControl** are no longer read-only, allowing you to select supported video and pixel formats.

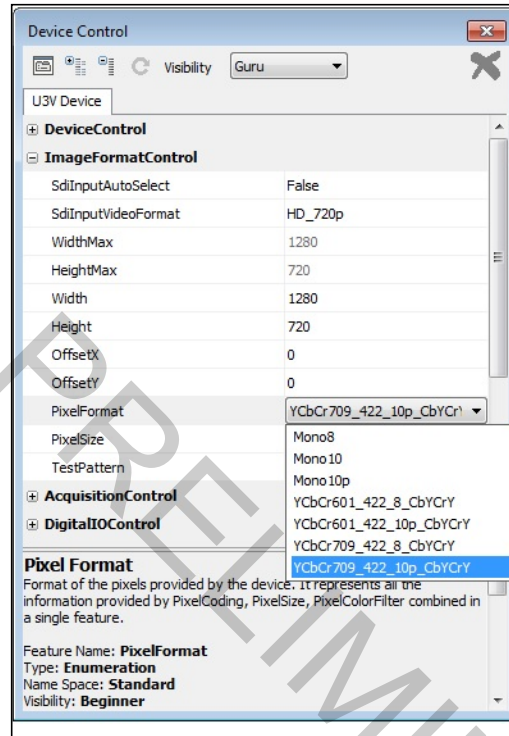


Images may appear incorrectly if the pixel format and/or the video format are selected manually and are not compatible with the incoming video. The preferred option is to allow the auto-selection feature to select the best image settings. Switching from color to monochrome does not cause any issues.

To change the pixel format

1. Start eBUS Player and connect to the external frame grabber.
For more information, see [“Starting eBUS Player and Streaming Video”](#) on page 29.
2. If images are streaming, click the **Stop** button.
3. Under **Parameters and Controls**, click **Device control**.

4. Under **ImageFormatControl**, change **SdiInputAutoSelect** to **False**.
5. Under **ImageFormatControl**, set the **PixelFormat** feature to a format that suits your camera.



6. Close the Device Control dialog box.
7. Click **Play** to see the changes.

To configure the image width and height

1. Start eBUS Player and connect to the external frame grabber.
For more information, see “[Starting eBUS Player and Streaming Video](#)” on page 29.
2. If images are streaming, click the **Stop** button.
3. Under **Parameters and Controls**, click **Device control**.
4. Under **ImageFormatControl**, change the **Width** and **Height**.
5. Close the Device Control dialog box.



The configuration of image width and height is limited by the values available for WidthMax and HeightMax.

To change the video format

1. Start eBUS Player and connect to the external frame grabber
For more information, see “[Starting eBUS Player and Streaming Video](#)” on page 29.
2. If images are streaming, click the **Stop** button.
3. Under **Parameters and Controls**, click **Device control**.

4. Under **ImageFormatControl**, change **SdiInputAutoSelect** to **False**.
5. Under **ImageFormatControl**, set **SdiInputVideoFormat** to suit your camera.
6. Close the **Device Control** dialog box.



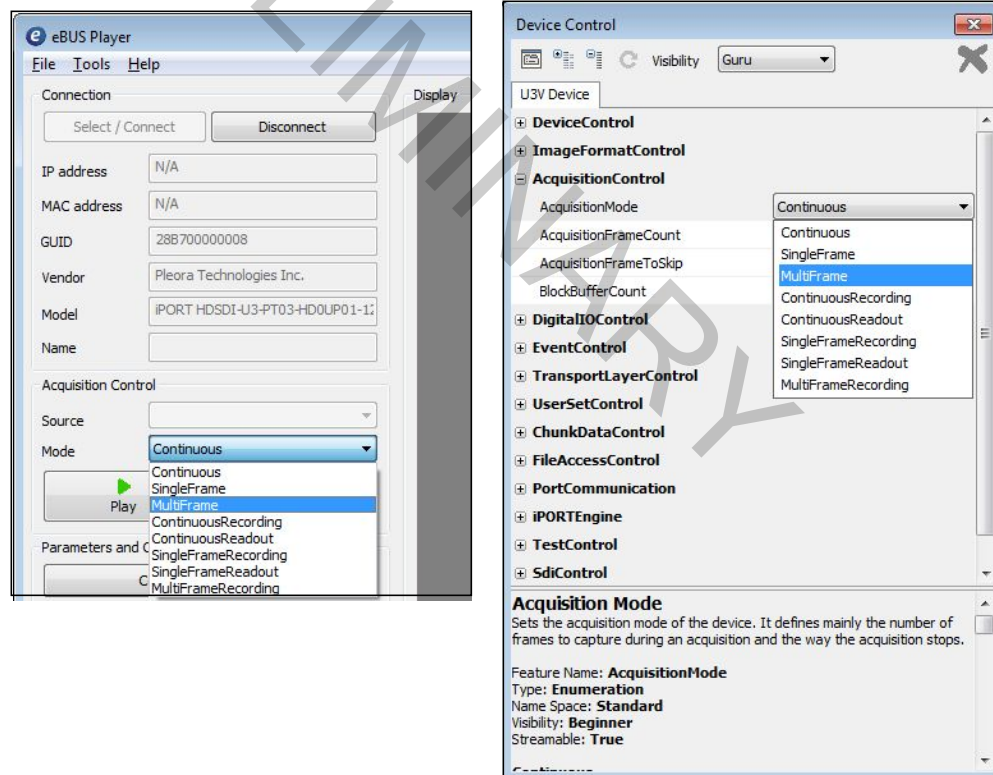
The selection of a different video format resets the **WidthMax** and **HeightMax** features to the maximum values for the selected format.

Configuring How Images are Acquired

Depending on the device you use, eBUS Player provides you with a list of image acquisition modes. The modes allow you to acquire images continuously or frame-by-frame. You can also save images to the external frame grabber's onboard memory so that you can retrieve them later.

Modes Standard on Most USB3 Vision Compliant Devices

Continuous, **SingleFrame**, and **MultiFrame** modes are usually standard for external frame grabbers. Acquisition starts when the **Play** button is pressed (the **AcquisitionStart** command is executed).



Recording and Readout Modes

The **recording** acquisition modes allow you to capture images from a camera and store them in the onboard memory. The **readout** acquisition modes allow images to be acquired from the device's memory at a slower rate, ensuring images are not lost.

These modes are helpful when you are working with a camera that transmits images at a rate that exceeds the connection between the external frame grabber and the computer, resulting in dropped images. By using the recording and readout modes, you can capture and stream images from the camera without losing any images (as long as there is space in the onboard memory).

The recording acquisition modes (**ContinuousRecording**, **MultiFrameRecording**, and **SingleFrameRecording**) support back-to-back recording, which allows you to click the **Stop** and **Play** buttons multiple consecutive times without the onboard memory being cleared.

Acquisition starts when the **Play** button is pressed (the **AcquisitionStart** command is executed) when one of the recording modes is selected.

Images can be stored in the external frame grabber's onboard memory as long as there is space or until there are 512 images in memory. For information about calculating how many images you can store, see [“Calculating How Many Images Can be Stored in Onboard Memory”](#) on page 39.



If the USB cable is disconnected, or if the computer is restarted, all captured images will be lost.

Understanding When Images are Removed from Onboard Memory

The following actions remove the images from the external frame grabber's onboard memory:

- Streaming images from the onboard memory using one of the readout acquisition modes (**ContinuousReadout** or **SingleFrameReadout**).
- Power cycling the device, which clears all images from the onboard memory.
- Making any of the following **AcquisitionMode** changes and then clicking the **Play** button (**AcquisitionStart** command):

Table 16: Changes that Clear Images from the Onboard Memory

First you acquire images with...	And then you change the Acquisition mode to...
ContinuousRecording, MultiFrameRecording, or SingleFrameRecording	Continuous, MultiFrame, or SingleFrame
SingleFrameReadout or ContinuousReadout	SingleFrame, MultiFrame, or Continuous
SingleFrameReadout or ContinuousReadout	ContinuousRecording, MultiFrameRecording, or SingleFrameRecording

ContinuousRecordingMode

With this mode, images are acquired continuously and are stored in the device's onboard memory until the memory is full (or 512 images are stored in onboard memory). When this limit is reached, the external frame grabber stops acquiring new images from the camera.

We recommend that you observe **AcquisitionControl > BlockBufferCount** (**Expert** or **Guru** visibility level is required). When the value for this feature stops increasing, the memory is full. For information about the actions that clear the images from onboard memory, see [“Understanding When Images are Removed from Onboard Memory”](#) on page 37.



To determine how many images can be stored in memory, see [“Calculating How Many Images Can be Stored in Onboard Memory”](#) on page 39.

ContinuousReadout Mode

With this mode, images are continuously read (and removed) from the device's onboard memory. The readout begins at the first image in memory. To see the number of images stored in onboard memory, see **AcquisitionControl > BlockBufferCount** in the **Device Control** dialog (**Expert** or **Guru** visibility level is required).

Readout continues until the **Stop** button is pressed (**AcquisitionStop** command is executed) or until the last image has been sent by the device (**BlockBufferCount** will be 0).

MultiFrameRecording Mode

With this mode, a fixed number of images are stored in the device's onboard memory. To configure the number of images, set the **AcquisitionControl > AcquisitionFrameCount** feature in the **Device Control** dialog. Images can be read out from memory using **ContinuousReadout** mode.



A maximum of 512 images can be acquired at one time in MultiFrameRecording mode.



To determine how many images can be stored in memory, see [“Calculating How Many Images Can be Stored in Onboard Memory”](#) on page 39.

If **AcquisitionControl > AcquisitionFrameCount** is set to a value that exceeds the amount of available memory, the external frame grabber stops acquiring new images when the onboard memory is full (or 512 images are stored in onboard memory).

BlockBufferCount shows the number of images currently in memory. In MultiFrameRecording mode, this number is cumulative: If the memory is empty and you acquire an image, **BlockBufferCount** will match the **AcquisitionFrameCount**. If you stop and restart recording, **BlockBufferCount** will increment (to a maximum of 512 images, depending on the image size) and will no longer match the **AcquisitionFrameCount**.

For information about the actions that clear the images from onboard memory, see [“Understanding When Images are Removed from Onboard Memory”](#) on page 37.

SingleFrameRecording Mode

With this mode, a single image is saved in the external frame grabber’s onboard memory after each **AcquisitionStart** command.

For information about the actions that clear the images from onboard memory, see [“Understanding When Images are Removed from Onboard Memory”](#) on page 37.

SingleFrameReadout Mode

With this mode, a single image is acquired from the external frame grabber’s onboard memory.

Calculating How Many Images Can be Stored in Onboard Memory

For the recording modes, you can calculate the size of each image to determine how many images can be stored in onboard memory.

First, take note of the **PayloadSize**, which appears under **TransportLayerControl** in the Device Control dialog box. Expert or Guru visibility level is required to access this feature.

The **PayloadSize** is automatically calculated based on the selected image settings, using the following equation:

$$\text{PayloadSize} = \text{Width} \times \text{Height} \times (\text{PixelSize}/8).$$

For example, for a device configured to use Mono10p with images that are 1920 x 1080, the **PayloadSize** is equal to 2 592 000 bytes per image or 2 472 MB (2 592 000 / 1 048 576).

After determining **PayloadSize**, you can use the following equation to determine the number of images that can be saved in onboard memory:

$$\frac{\text{Available onboard memory MB}}{\text{PayloadSize MB}} = \text{Number of images that can be saved}$$

Using our example, the equation is:

$$\frac{120 \text{ MB}}{2\,472 \text{ MB}} = 48 \text{ images}$$

Implementing the eBUS SDK

You can create your own image acquisition software for the external frame grabber. Consult the *eBUS SDK Programmer’s Guide*, *eBUS SDK C++ API Quick Start Guide*, *eBUS SDK C++ API Help file*, *eBUS SDK .NET API Quick Start Guide*, and the *eBUS SDK .NET API Help file* for information about creating custom image acquisition software.

PRELIMINARY

Chapter 8



Reference: Mechanical Drawings and Material List

This chapter provides the mechanical drawings, and also provides a list of connectors and cables, with corresponding manufacturer details.



Three-dimensional (3-D) mechanical drawings are available at the Pleora Technologies Support Center.

The following topics are covered in this chapter:

- “[Mechanical Drawings](#)” on page 42
- “[Material List](#)” on page 45

Mechanical Drawings

The mechanical drawings in this section provide the external frame grabber's dimensions, features, and attributes. All dimensions are in millimeters.

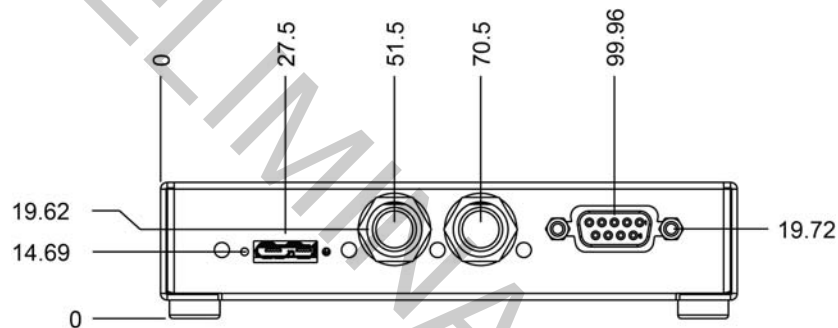


The drawings in this section include all connectors on the HDSDI-U3-IND External Frame Grabber (industrial model). Because there are two external frame grabber models, your device may not have all of the connectors shown in this chapter.

Desk-Mounted HDSDI-U3-IND External Frame Grabber

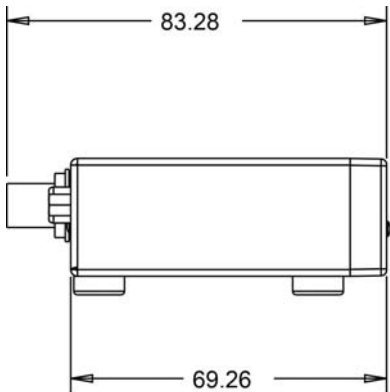
The following diagram shows the rear connectors and the rubber feet of the desk-mounted HDSDI-U3-IND External Frame Grabber.

Figure 8: HDSDI-U3-IND External Frame Grabber Connectors: Desk-Mounted



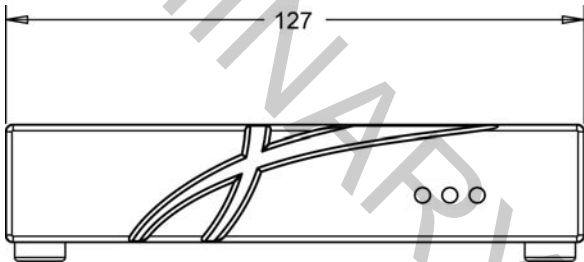
The following diagram shows the total depth of the desk-mounted HDSDI-U3-IND External Frame Grabber.

Figure 9: HDSDI-U3-IND External Frame Grabber Total Depth



The following diagram shows the total width of the desk-mounted HDSDI-U3-IND External Frame Grabber.

Figure 10: HDSDI-U3-IND External Frame Grabber Total Width



The following diagram shows the total height, including the rubber feet, of the desk-mounted HDSDI-U3-IND External Frame Grabber.

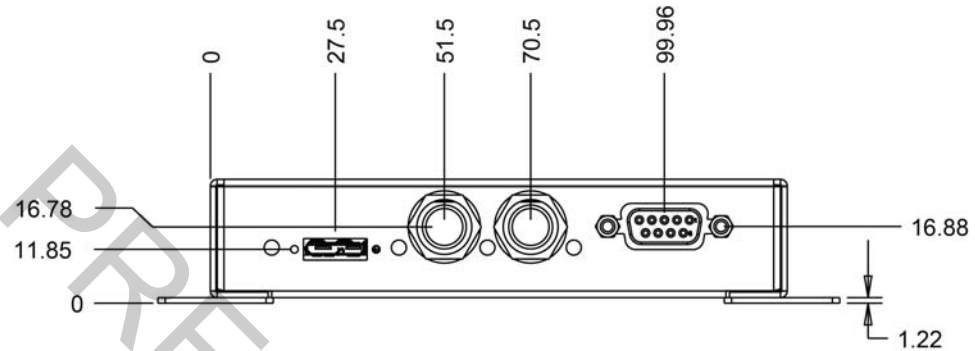
Figure 11: HDSDI-U3-IND External Frame Grabber Total Height



Surface or Wall-Mounted HDSDI-U3-IND External Frame Grabber

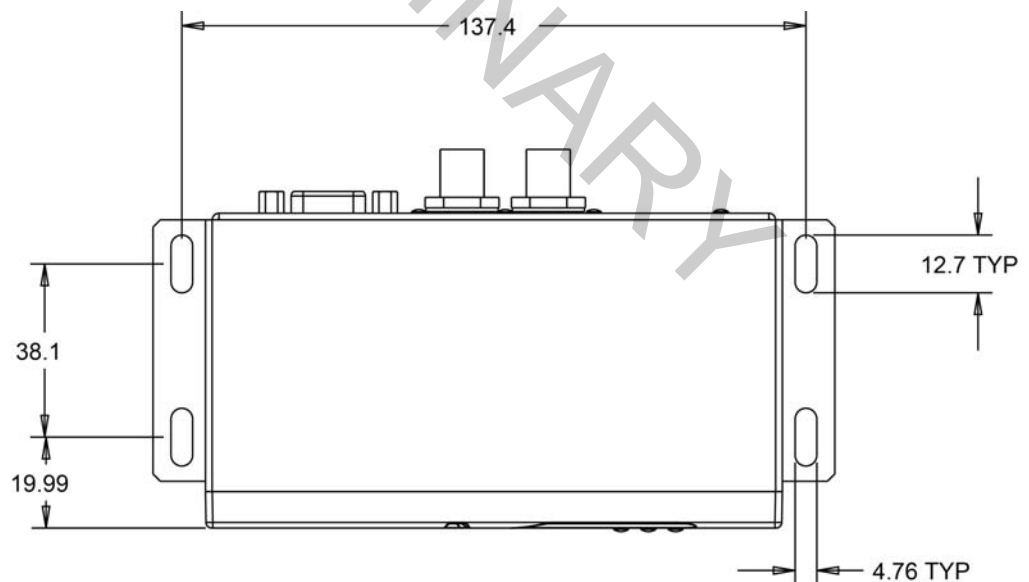
The following diagram shows the rear connectors and the mounting brackets of the surface or wall-mounted HDSDI-U3-IND External Frame Grabber.

Figure 12: HDSDI-U3-IND External Frame Grabber Connectors: Surface or Wall-Mounted



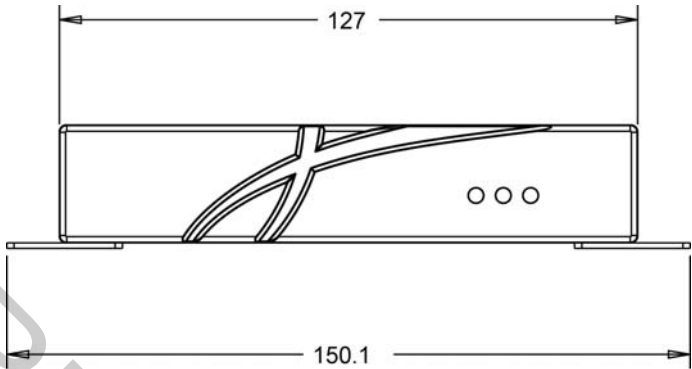
The following diagram shows the dimensions for the screw holes in the mounting brackets of the surface or wall-mounted HDSDI-U3-IND External Frame Grabber.

Figure 13: HDSDI-U3-IND External Frame Grabber Screw Hole Dimensions: Surface or Wall-Mounted



The following diagram shows the total width of the surface or wall-mounted HDSDI-U3-IND External Frame Grabber including the mounting brackets.

Figure 14: HDSDI-U3-IND External Frame Grabber Total Width Including Brackets



Material List

The connector details for the HDSDI-U3 External Frame Grabber are listed in the following table.

Table 17: Connector Summary

Description	Manufacturer part number	Manufacturer
Micro-B USB 3.0 connector	897-10-010-40-300002	MILL-MAX
BNC connector, 75 Ohms	073171-3355	MOLEX
9-Pin D-sub female connector	SDS107-PRP2-F09-SN63-11	SULLINS



Source manufacturer, description, and identification may vary for each connector and accessory.

PRELIMINARY

Chapter 9



Reference: Surface or Wall-Mount Bracket Assembly

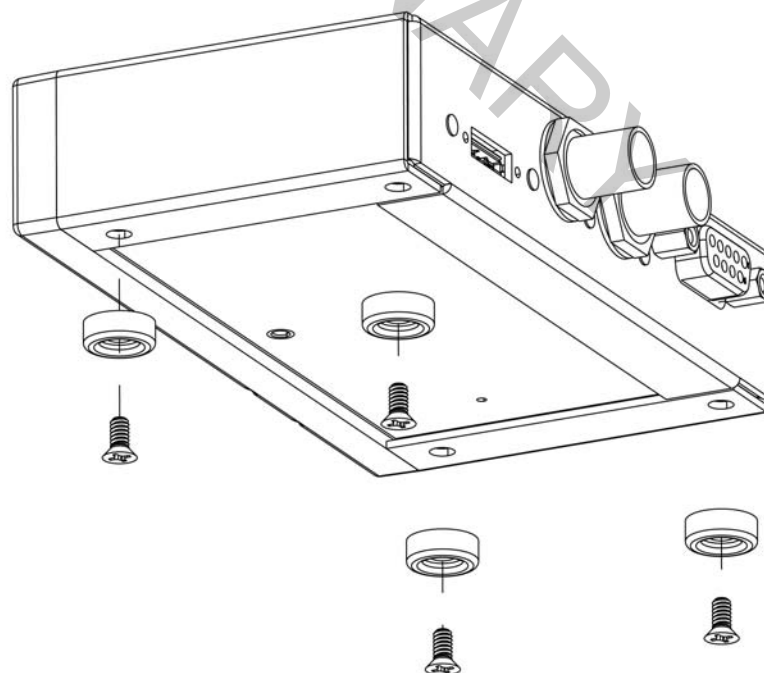
This chapter provides instructions for mounting the external frame grabber to a surface or wall.



For more information about the bracket kit, see [“iPORT HDSDI-U3 External Frame Grabber Models”](#) on page 5.

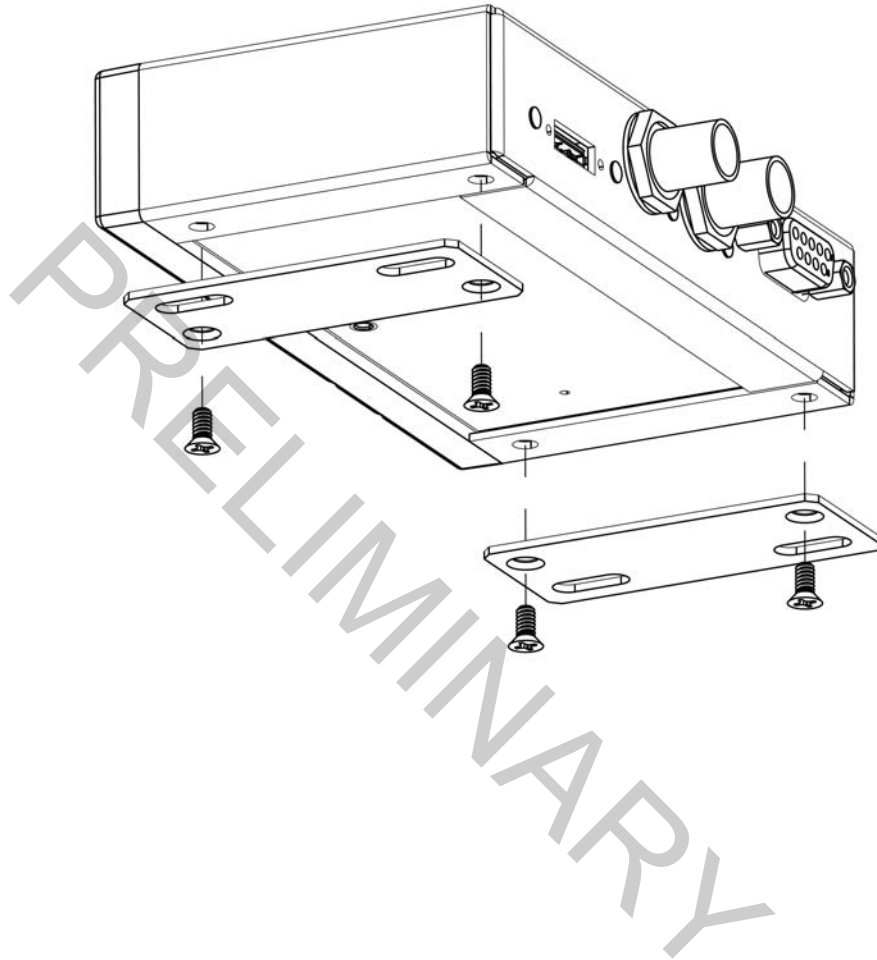
To assemble the brackets, first remove the rubber feet from the bottom of the external frame grabber, as shown in the following diagram.

Figure 15: HDSDI-U3 External Frame Grabber: Removing Rubber Feet



After you have removed the rubber feet, attach the brackets with the supplied screws, as shown in the following diagram.

Figure 16: HDSOI-U3 External Frame Grabber: Attaching Brackets



Chapter 10



System Troubleshooting

The scenarios and known issues listed in the following table are those that you might encounter during the setup and operation of your external frame grabber. Not all possible scenarios and errors are presented. The symptoms, possible causes, and resolutions depend upon your particular network, setup, and operation



You can refer to the Pleora Technologies Support Center at www.pleora.com for additional support and assistance.

Details for creating a customer account are available on the Pleora Technologies Support Center.



Refer to the product release notes that are available on the Pleora Technologies Support Center for known issues and other product features.

Table 18: Troubleshooting Tips

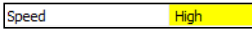


Symptom	Possible cause	Resolution
When selecting the device for connection, the Speed (in the Device Selection dialog box in eBUS Player) says High instead of Super , and a warning icon appears. 	The external frame grabber is connected to a USB 2.0 port on your computer, not a USB 3.0 port.	Connect the external frame grabber to a USB 3.0 port on your computer.
	The USB 3.0 port may have experienced a power surge.	Troubleshoot the USB 3.0 port in your computer by: <ul style="list-style-type: none">Connecting the external frame grabber to another USB 3.0 port on your computer.Disconnecting the external frame grabber from the computer and rebooting the computer.

Table 18: Troubleshooting Tips (Continued)

Symptom	Possible cause	Resolution
When you connect the external frame grabber to a USB port on your computer, a Windows warning appears, indicating that the driver could not be installed.	The Pleora USB3 Vision driver is not installed on your computer.	Install the Pleora USB3 Vision driver on your computer using the eBUS Driver Installation Tool (Start > All Programs > Pleora Technologies Inc > eBUS SDK > Tools > eBUS Driver Installation Tool).
The Pleora Driver Installed field says False . 	The Pleora USB3 Vision driver is not installed on your computer.	Install the Pleora USB3 Vision driver on your computer using the eBUS Driver Installation Tool.
The License field (in the Device Selection dialog box in eBUS Player) says Invalid .  The external frame grabber appears in the Device Selection dialog box in eBUS Player but you cannot connect to it.	The Pleora USB3 Vision driver is not installed on your computer.	Install the Pleora USB3 Vision driver on your computer using the eBUS Driver Installation Tool.
	The USB host controller is shared, resulting in an inadequate power supply.	Disconnect devices from your USB hub that are drawing power from the USB hub.
Image errors appear as soon as you click Play and images do not stream.	The external frame grabber settings may not match the configuration of the image data that is being received from the camera.	Ensure the following external frame grabber settings match the configuration of the image data from the camera: <ul style="list-style-type: none"> • SdiInputVideoFormat • PixelFormat • Width • Height
Dropped images, dropped connection, or failure to connect to the external frame grabber.	The power supply from the USB port may be inadequate.	Ensure adequate power is available from the USB port.
USB LED flashes yellow without green.	The external frame grabber may be connected to a USB 2.0 port on your computer.	Connect the external frame grabber to a USB 3.0 port on your computer.

Chapter 11



Technical Support

On the Pleora Support Center, you can:

- Download the latest software.
- Log a support issue.
- View documentation for current and past releases.
- Browse for solutions to problems other customers have encountered.
- Get presentations and application notes.
- Get the latest news and information about our products.
- Decide which of Pleora's products work best for you.

To visit the Pleora Support Center

- Go to www.pleora.com and click **Support Center**.
If you have not registered yet, you are prompted to register.
Accounts are usually validated within one business day.

PRELIMINARY